Reducing VOC Emissions from Field Fumigants

November 2008 Update

Restrictions on farm fumigants reduce smog-producing emissions from pesticides.

California is committed to reducing smog-producing emissions of volatile organic compounds (VOCs) from all sources, including pesticides. This prompted the Department of Pesticide Regulation (DPR) to put regulations into place in January 2008 to reduce emissions from field fumigants.

The rules changed how field fumigations could be done in many regions of the state:

- Fumigant emissions must be kept below a target level in certain geographic areas from May to October. This can require limits on emissions from fumigant applications done by individual farmers.
- Some high-emission field fumigation methods are prohibited. In certain areas, only low-emission methods can be done.
- Pesticide use reports in five geographic regions must specify the application method for field fumigations.
- Beginning in 2009, companies that do field fumigations must have a supervisor with special training. This applies statewide.

Which fumigants do the rules apply to?

The rules apply to field fumigations with any of seven farm fumigants that release VOCs:

- Methyl bromide
- 1,3-Dichloropropene (brand names, Telone, Inline)
- Chloropicrin
- Metam-sodium (Vapam, Sectagon), which produces methyl isothiocyanate (MITC), a VOC
- Potassium N-methyldithiocarbamate, also called metam-potassium (K-Pam), which produces MITC

- Dazomet, also called tetra-hydro-3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione (Basamid), which produces MITC
- Sodium tetrathiocarbonate (Enzone), which produces carbon disulfide gas

Background Information

What are volatile organic compounds (VOCs)?

VOCs are gases that can combine with other substances in the air to form ground-level ozone (smog). Ozone can damage lung tissue, cause respiratory illness, and harm farm crops. The primary VOC source is vehicle exhaust. Industrial operations also emit VOCs, as do thousands of products, including pesticides.

Statewide, pesticides account for about two percent of all VOCs, but in several regions, they are among the top ten sources.

How is California reducing VOCs?

Under the U.S. Clean Air Act, each state must meet federal air quality standards. States must specify how they plan to do that in a federally approved "State Implementation Plan" (SIP). Under California's SIP, DPR must track and control VOC emissions from pesticide products used in agriculture and by commercial structural applicators in five ozone nonattainment areas (NAAs): Sacramento Metro, San Joaquin Valley, Southeast Desert, South Coast, and Ventura. The California Air Resources Board (ARB) is responsible for VOC emissions from pesticides in consumer products.

How much pesticide VOC reduction is needed?

California is expected to reduce pesticide VOCs by from 12 percent to 20 percent (depending on the NAA) compared to 1990 levels. The base year is 1990 because that when the U.S. Clean Air Act was amended to require states to track and reduce pollutant emissions.

How do the regulations reduce pesticide VOCs?

The rules are designed to limit fumigant emissions in the NAAs. Depending on how much pesticide VOCs need to be reduced, low-emission application methods may be required and emission restrictions can be placed on individual growers in these areas.

In the future, DPR may explore alternative approaches to reducing fumigant emissions.

Are all fumigant uses affected?

No, the regulations affect only field soil treatments because more than 90 percent of fumigant emissions come from these applications.

The restrictions do not apply to fumigant use in greenhouses, certain nursery fumigations,

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potting soil, individual tree and vine replant sites, harvested commodities, or structures.

Why not reduce VOCs by only requiring that low-emission methods be used?

Low-emission methods may not keep VOCs below the target level in an NAA. For example, an increase in fumigated acres — even though only low-emission methods are used — may put an area over its target level. Or an increase in emissions from nonfumigant pesticides may trigger a need for greater reductions in fumigant emissions.

Why focus on fumigants?

Fumigants account for a high proportion of pesticide VOCs. Also, modifying field fumigation practices was the only feasible way to meet a court-imposed deadline of January 2008 to have regulations in place. After the regulations went into effect, the deadline was made moot when an appeals court reversed the lower court order in August 2008.

However, the higher court ruling did not weaken California's commitment to meet federal air quality standards, or affect the status of regulations already in place. The ruling did give DPR more flexibility to tailor control measures in a manner it believes best achieves the goals of the clean air laws while recognizing the impact of severe restrictions on farm communities. As a result, DPR plans to amend the regulations to ensure a measured, reasonable approach that appropriately meets legal commitments.

What about reducing VOCs from non-fumigant pesticides?

DPR is working with manufacturers of non-fumigant pesticides to reformulate products so they emit less VOC, mainly by changing solvents in them. The Department has also sponsored university research into insecticides with low-VOC potential.

DPR is also promoting cleaner, more efficient application technologies. For example, DPR funded use by farmers of several target-sensing "smart sprayers" that turn off application nozzles between plants. University researchers are studying this technology to find the best way to use it to reduce VOC emissions, drift, and pesticide use. We also sponsored a pesticide VOC research symposium to coordinate research activities and discuss research needs.

Areas Affected

What is a nonattainment area?

A nonattainment area (NAA) is a geographic region designated by U.S. EPA as failing to meet federal air quality standards for one or more "criteria" air pollutants. Criteria pollutants are those known to be hazardous to human health.

The five NAAs affected by the pesticide VOC regulations are *ozone* non-

For a map of the areas affected by the new rules, go to www.cdpr.ca.gov, click on "A-Z Index," then "Nonattainment area maps."

attainment areas, that is, ozone levels in these regions are higher than clean air standards allow.

Because of the controls DPR already put in place, the Sacramento Metro and South Coast NAAs now meet pesticide VOC reduction goals. The San Joaquin Valley, Southeast Desert, and Ventura NAAs do not, and further control measures are needed.

What counties are in the three NAAs that need further pesticide VOCs reductions?

San Joaquin Valley NAA: All of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, and Tulare counties and the valley portion of Kern County.

Southeast Desert NAA: The desert portions of Riverside (Coachella Valley), Los Angeles (Lancaster/ Palmdale), and San Bernardino (Barstow) counties.

Ventura NAA: All of Ventura County.

For NAA maps and geographic sections, go to www.cdpr.ca.gov, click on "A-Z Index," then "Nonattainment area maps."

Fumigation Methods Allowed

What are low-emission application methods?

Lower-emission methods are typically those that are:

- Covered with tarpaulins,
- Covered with several post-fumigation water treatments, or
- Applied through drip irrigation.

Other ways of limiting emissions are also specified in the regulations, depending on the fumigant. They include reduced application rates, soil moisture requirements, injection depth specifications, soil compaction requirements, and a mandate for a tarpaulin repair response plan.

What fumigant application methods are allowed?

Outside the five NAAs: Farmers can use any application method allowed by the product labeling, except for methyl bromide fumigations. DPR had already restricted methyl bromide applications to reduce air toxins, and only methods allowed in those earlier regulations can be used.

In the Sacramento and South Coast NAAs (where pesticide VOCs have already been reduced below emission targets): Only certain standardized fumigant application methods can be used between May 1 and October 31. These are methods for which DPR has emission data, and include nearly all those that are commonly used.

In the San Joaquin Valley, Southeast Desert, and Ventura NAAs (where further VOC reductions are needed): Only low-emission methods can be used between May 1 and October 31.

From May 1 to October 31, all fumigations in the nonattainment areas must be done using certain application methods.

Go to www.cdpr.ca.gov, and click on the red "Fumigant/VOC regs" Quick Link at the top of the page to download fact sheets on the fumigation methods that can be used in each of the five NAAs.

What happens if new application methods are developed that have lower emissions?

Pesticide makers are encouraged to develop new, lower-emission methods. They can submit emission data on these methods to DPR. DPR has an expedited approval process if new application methods are developed that lower emissions.

If emissions are no greater than current standardized methods for that fumigant, the new methods will be approved for use in the Sacramento and South Coast NAAs. If emissions are no greater than the low-emission methods for the fumigant, they will be approved for use in all five NAAs.

Information on any additional fumigation methods approved by DPR is posted on www.cdpr.ca.gov, click on "Fumigant/VOC regs."

Emission Limits

How are limits on fumigations determined?

The system is designed to limit VOC emissions, not fumigations. Even if emissions limits are imposed in an NAA, it does not mean that all requested fumigations cannot be done. The outcome depends on DPR's calculation of what emissions will result from the number of fumigations requested, and which fumigants growers plan to use. Each farmer in the NAA receives an emission allocation, and it is up to them to decide if they can conduct fumigations as planned or if they need to revise their plans, for example, by using lower-emission fumigation methods or products.

California's SIP requires that pesticide VOCs be reduced in each NAA by 12 percent to 20 percent below 1990 levels, depending on the NAA. Late each year, DPR uses the previous year's pesticide use report data to develop controls for the upcoming year (for example, in 2008, DPR analyzed 2007 data to develop limits for 2009). DPR scientists calculate what pesticide VOC emissions were in the previous year to determine if they trigger the need for an emission allocation system in the NAA in the upcoming year. *(More information on how DPR calculates VOC emissions is available at www.cdpr.ca.gov, click on "A-Z Index" and "Emission inventory.")*

Where will fumigation emission allowances be used in 2009?

In 2008, fumigant emission allowances were required only in Ventura County, and will continue there in 2009. In the San Joaquin Valley and Southeast Desert NAAs, the requirement that only low-

Reducing emissions and use will also help reduce toxic exposure to fumigants. However, this is not the primary goal.

emission fumigation methods be used is expected to be sufficient to achieve required VOC reductions in 2009 and 2010. The need for allowances will be reassessed for 2011.

How do the emission limits work?

All farm fumigants are restricted materials and require a site- and time-specific permit from the County Agricultural Commissioner.

At the beginning of each year, farmers in an NAA where the emission allocation system will be needed must request an emission allowance. (In 2009 and 2010, the allocation system will be used only in Ventura County.)

Allocation requests from farmers must include the name of the product, the application rate, crop, acres, fumigation method, and projected month of application.

The limits only apply from May 1 to October 31, the "ozone season" in California when air pollution is a significant problem. Farmers who plan to fumigate before May 1 or after October 31 do not need to apply for an emission allowance.

Commissioners forward emission requests to DPR. If the total amount of fumigant use requested by all growers is above the NAA's emission limit, DPR will impose proportionate reductions to bring emissions below the limit.

How are emission limits enforced?

The Commissioner issues fumigant permits conditioned on applicators staying under their emission allowance. Applicators can choose to meet the emission allowance by changing to a lower-emission application method or product, using a lower application rate, or by treating less acreage. They may also schedule their application before May 1 or after October 31, when the emission restrictions do not apply.

Before using any restricted material, farmers must send a "notice of intent" (NOI) to use the pesticide, giving the time and date of the application. In this instance, the NOI allows the County Agricultural Commissioner's staff opportunity to review the proposed fumigant use to ensure that emissions from it would not exceed the grower's emission allowance.

If a grower's fumigant applications were to exceed the emission allowance, it would violate the restricted materials permit, which can result in suspension or revocation of the permit and referral to local or state agencies for further enforcement action.

Why are the controls in Ventura County being phased in over five years?

Ventura County has already met its required reductions in overall VOCs

In NAAs where it is necessary to do so, DPR assigns each grower an emission allowance for applications planned from May through October. Growers decide how to adjust their planned applications to keep emissions within their allowance.

by greater-than-expected decreases in VOC emissions from vehicles.

At the same time, the new rules could cause short-term but possibly significant losses in the Ventura County economy, and the potential for long-term loss of farmland to urban development.

As a result, DPR proposed to phase in emission reductions in Ventura County over five years. In July 2008, U.S. EPA approved this request, Revised state regulations allowing the phase-in went into effect September 3, 2008. This gives regulated entities time to develop strategies to comply with fumigant restrictions which now go into full effect in 2012.

Licensing Requirements

What are the new licensing requirements?

Beginning in 2009, when licensed pest control businesses do field fumigations, the work must be supervised by a qualified applicator that has a special field fumigation license. The person acting in a supervisory capacity for a pest control business that conducts field fumigations must also get the special field fumigation license. This is a statewide requirement.

Private applicators who do field fumigations are not required to hold the special fumigation license.

How can commercial applicators get a fumigation license?

Training and testing materials for the fumigator license subcategory will be available in late 2008.

Anyone who already has a qualified applicator license or certificate in pest control category D, G or J, and who has at least two years recent experience conducting field fumigation, will be able to qualify for the license subcategory without exams or fees.

Experienced applicators wishing to take advantage of this option must apply by December 31, 2008. Applicants after that date must take the examination and pay required fees.

More information on the procedures to get a fumigation license is available on DPR's licensing Web pages, www.cdpr.ca.gov, click on "Licensing."

Beginning in 2009, pest control businesses that do field fumigations must have a supervisor with special training. This requirement applies statewide.

Use Reporting

What are the use reporting requirements for field fumigations?

DPR uses pesticide use reports to help determine total fumigant emissions for each NAA. (Different methods of applying fumigants emit different amounts of VOCs.)

In 2008, persons or companies applying field fumigants were

required to send a separate copy of the pesticide use report containing the method information directly to DPR.

Starting in January 2009, it will no longer be necessary to send a separate copy of the use report to DPR. The use report forms and county software have been revised to accommodate fumigant method reporting.

As part of their routine pesticide use reporting, applicators must include a four-digit code corresponding to the specific method used in each field fumigation. This reporting requirement is in effect year-round. It is mandatory in all five NAAs, and voluntary in other parts of the state.

More information on fumigant use reporting, including revised forms and a list of the method codes, can be found at www.cdpr.ca.gov, click on the red "Fumigant/VOC regs" Quick Link, and then "Reporting of fumigation methods used."

For More Information

You can view or download fact sheets, the regulation text, and other information from DPR's Web site, www.cdpr.ca.gov, click on "Fumigant/VOC regs" in the red Quick Links at the top of the page.

You can view or download fact sheets and other information about the new rules from DPR's Web site, www.cdpr.ca.gov, click on "Fumigant/VOC Regs" in the red Quick Links at the top of the page

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About the Department of Pesticide Regulation

The California Department of Pesticide Regulation (DPR) protects human health and the environment by regulating pesticide sales and use and by fostering reduced-risk pest management. DPR's strict oversight includes product evaluation and registration, environmental monitoring, residue testing of fresh produce, and local use enforcement through the County Agricultural Commissioners. DPR is one of six boards and departments within the California Environmental Protection Agency.